Self-Weighing in Weight Management Interventions: A Systematic Review of Literature

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Abstract

Background: Self-weighing increases a person's self-awareness of current weight and weight patterns. Increased self-weighing frequency can help an individual prevent weight gain. Literature, however, is limited in describing variability in self-weighing strategies and how the variability is associated with weight management outcomes. **Aim**: This review analyzed self-weighing in weight management interventions and the effects of self-weighing on weight and other outcomes. **Methods**: Twenty-two articles from PubMed, CINAHL, Medline, PsychInfo, and Academic Search Premier were extracted for review. **Results**: These 22 articles reported findings from 19 intervention trials, mostly on weight loss or weight gain prevention. The majority of the reviewed articles reported interventions that combined self-weighing with other self-monitoring strategies (64%), adopted daily self-weighing frequency (84%), and implemented interventions up to six months (59%). One-half of the articles mentioned that technology-enhanced or regular weight scales were given to study participants. Of the articles that provided efficacy data, 75% of self-weighing-only interventions and 67% of combined interventions demonstrated improved weight outcomes. No negative psychological effects were found. **Conclusions:** Self-weighing is likely to improve weight outcomes, particularly when performed daily or weekly, without causing untoward adverse effects. Weight management interventions could consider including this strategy.

Keywords:

Obesity; Overweight; Self-monitoring; Self-regulation; Self-weighing; Weight loss

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1. Introduction

More than two-thirds of adults in the United States are either overweight or obese [1]. Weight management interventions are needed to help people maintain healthy weight and potentially reduce obesity-related chronic diseases and the costs derived from treating such diseases. Effective weight management interventions that are simple, not costly, and can be easily implemented by the general public would have a great impact on population health. Self-weighing can be easily performed by an individual at home or at work without much professional help. Self-weighing increases a person's self-awareness of current weight and weight patterns. The awareness can trigger a self-evaluation response involving interpretation of weight data against a goal or a standard, and after self-evaluation a series of actions can take place including self-enforcement or self-adjustment [2,3,4].

Increased self-weighing frequency can help an individual prevent weight gain. For instance, a previous study found that individuals with an increase in self-weighing frequency within one year gained less weight than those whose self-weighing frequency decreased in the same time period [5]. Prior systematic reviews conclude that regular self-weighing at a frequency of daily or weekly is associated with more weight loss or better weight gain prevention [6,7]. Those reviews, however, have not clearly delineated variability in self-weighing strategies and how the variability is associated with weight management outcomes. Self-monitoring strategies, including self-weighing, dietary self-monitoring, and self-monitoring of physical activity are effective weight management interventions and each strategy can be a stand-alone weight management intervention or part of a more complex self-monitoring intervention that tracks weight, food intake and physical activity [8]. A recent systematic review, however, reports that self-weighing as a stand-alone strategy may be less effective in weight management than

multicomponent interventions that include self-weighing [9]. This recent systematic review includes only one study with self-weighing being a stand-alone self-monitoring strategy. Additional literature analysis that examine more studies on self-weighing as a single self-monitoring strategy is warranted.

Adherence to self-weighing may become a challenge for study participants when they need to perform weighing behavior daily for a period of time and when self-weighing involves multiple steps in processing weight check and weight data [7]. Literature, including previous reviews, has been limited in offering detailed information about how self-weighing intervention is implemented, such as how to self-perform weighing, submit weight data, or adjust food intake or physical activity after each self-weighing. Such information could be used to facilitate self-weighing and improve adherence and weight outcomes.

Some studies have shown that frequent self-weighing could lead to unhealthy and extreme weight control behaviors, low self-esteem, and greater body dissatisfaction [10,11]. Other researchers, however, argue that negative psychological outcomes from self-weighing can be offset by properly designed feedback [12]. Previous systematic reviews have produced conflicting conclusions. One review concludes that self-weighing is not associated with negative psychological outcomes [7]; another review indicates that adverse events are probably related to the weight management intervention, not specifically self-weighing [9]; and a third review suggests that unintended psychological outcomes (affect, self-esteem, body evaluation and eating behavior/cognition) tend to occur in women and young individuals but not in overweight or treatment-seeking people [13]. It may be that body weight is a confounder that influences how self-weighing affects psychological outcomes. Assessing “side effects” of self-weighing is not

only important in preventing unnecessary events but also in enhancing the validity of a study. Further assessment of psychological effects from self-weighing is needed.

In sum, self-weighing is likely to be a useful weight management intervention to help people prevent weight gain or facilitate weight loss. Self-weighing empowers an individual to monitor his/her own weight and subsequently to make a necessary lifestyle adjustment to meet a target goal. Literature on self-weighing interventions, especially relevant to implementation details and its effects on weight and psychological outcomes, has been limited. This systematic review intends to fill these gaps in the self-weighing literature.

2. Purpose

The purpose of this systematic review was to analyze self-weighing in weight management interventions among overweight and obese adults and to assess the effects of self-weighing on weight and other outcomes. Our review included four specific aims: (1) to identify methodological features (designs, samples, theories used in interventions, etc.) in self-weighing studies, (2) to analyze self-weighing intervention doses and delivery, (3) to identify details of the self-weighing intervention, and (4) to summarize self-weighing intervention efficacy and major findings.

3. Methods

3.1 Search Strategy:

A comprehensive search of the literature was conducted to identify experimental or quasi-experimental studies or their ancillary studies in which self-weighing was a major intervention component. Search engines included PubMed, CINAHL, Medline, PsychInfo, and Academic Search Premier, with several search terms of “self-weighing, weight management, weight control, body weight monitoring, self-recording, body weight changes, self-care” Inclusion criteria were: experimental or quasi-experimental studies or their ancillary studies;

focus on weight gain, weight loss, or weight maintenance; samples of adults who were overweight or obese but did not have other major health issues; peer-reviewed and English language articles published in or after the year 2000. Excluded were: conference abstracts; studies of adolescents, pregnant women, university students, or populations with a specific health problem (e.g., heart disease or diabetes); and studies that did not report self-weighing data or their association with an outcome.

We selected only literature published in or after the year 2000 based on two publications. First, it was noted that before 1993 literature about using self-monitoring of weight, diet, and/or physical activity to control weight was scarce [8]. Second, in a 2014 systematic review of weight management interventions, the great majority (88%) of the 67 included articles were published in or after the year 2000 [14]. We excluded certain populations in this review for several reasons. Weight loss is not recommended for pregnant women [15] and therefore we excluded this population. Some psychological issues, such as depression, are potentially high in diabetic and heart failure patients [16], and these associations might have affected our assessment of psychological effects from self-weighing. Self-weighing and eating disorders are potentially high in adolescents and university students [2], so we also excluded these populations.

3.2 Data Extraction

Figure 1 shows the disposition of articles based on the PRISMA model. The searches resulted in 208 articles. One author reviewed citation titles and retained 68 articles. This author then screened abstracts of those 68 articles and excluded an additional 20 articles and 20 duplicates, thus retaining 28 articles for the review. Two authors independently reviewed the 28 articles to ensure they met inclusion criteria; eight articles were excluded at this stage and two

additional ones were selected from the references of the reviewed articles. This process resulted in a final inclusion of 22 articles.

3.3 Data Analysis

Three authors created tables for abstracting data from the articles relevant to the four study aims. Two authors independently read and retrieved information from each article and listed information in the tables. Disagreements were resolved through discussion. Analysis of frequencies and percentages, mostly based on the total number of articles, was used to increase clarity of data presentation. This systematic review was conducted between January and June of 2015.

4. Results

4.1 Methodological Features Included in Articles

Table 1 provides an overview of the methodological features of the articles. Of the 22 articles included in this review, 10 (45%) described original studies and another 12 (55%) reported ancillary studies or secondary analyses of one or two original intervention trials. The 22 articles reported findings from 19 intervention trials (four ancillary studies reported on two sets of trials each and one of the four also included one additional trial in report), of which 13 (68%) were conducted in United States, two (11%) in the United Kingdom, two (11%) in Japan, one (5%) in Australia, and one (5%) in Finland. Ten (53%) of the 19 trials were focused on weight loss, followed by weight gain prevention (n = 4, 21%), weight regain prevention after weight loss (n = 3, 16%), both weight gain prevention and weight loss (n = 1, 5%), or weight control (n = 1, 5%). All but one article [17] included at least one comparison group.

Sample sizes varied from 40 to 3,768. Nineteen (86%) of the 22 articles reported on

samples with an average age between 40 and 60 years, and women and White populations were over-represented. Women comprised 100% of the sample in three articles (14%) and 53% to 98% of the sample in the 18 (82%) other articles reporting gender data. Whites comprised 52% to 100% of the samples in the 17 articles reporting ethnicity data.

Approximately one-half (*n* = 10, 45%) of the 22 articles reported on studies that adopted the self-regulation theory to guide interventions, one article (5%) described the use of social cognitive theory, and 11 (50%) did not report use of any theoretical framework. Of the 10 articles that described original studies, six (60%) used the self-regulation theory, one (10%) used the social cognitive theory, and another three (30%) did not identify any theory.

4.2 Self-Weighing Intervention Doses and Delivery

Table 2 shows detailed information on self-weighing intervention doses and delivery.

4.2.1 Self-weighing vs. other self-monitoring strategies. All 22 articles described self-weighing as an intervention component. Of the 22 articles, eight (36%) were about studies that included only self-weighing and the rest (64%) combined self-weighing and other self-monitoring interventions (8 or 36% used self-weighing and self-monitoring of food intake and physical activity; 5 or 23% involved self-weighing and self-monitoring of physical activity; and 1 or 5% incorporated self-weighing and self-monitoring of food intake). Of the eight articles that described self-weighing as the sole self-monitoring strategy, four (50%) reported on original studies [2,18,19,20] and another four (50%) were ancillary or secondary studies based on an original intervention trial [17,21,22,23].

4.2.2 Length and frequency. The length of interventions described in the 22 articles ranged from 14 weeks to 3 years, with the majority (*n* = 13, 59%) being less than or equal to six months followed by 18 months (*n* = 4, 18%), 2-3 years (*n* = 3, 14%), or 12 months (*n* = 2, 9%).

The total number of intervention contacts reported in 16 of the 22 articles ranged from 1 to 48, and contacts were frequently tapered from weekly to biweekly or monthly. Only five (23%) articles described the length of each contact, with a range from 45 to 90 minutes.

4.2.3 Intervention delivery method. Of the 19 articles that described intervention delivery methods (three did not include such information), a face-to-face group meeting (*n* = 11, 58%) was most commonly used. During meetings, instructions on how to perform self-weighing and other self-monitoring activities as well as health education about healthy eating, exercise, and behavior change strategies were given. One article described face-to-face individual counseling. Other intervention delivery methods included Internet chat rooms, email communications, telephone calls, and newsletters. The non-face-to-face methods were used to send additional health information, tips for behavior change, feedback, or reminder messages.

4.3 Details of Self-weighing Interventions

Details of the self-weighing interventions are shown in Table 3 and described below.

4.3.1 Frequency of self-weighing. Of the 19 articles that included self-weighing frequency information, 16 (84%) used daily and three (16%) used weekly self-weighing.

4.3.2 Type of weight scale. In 11 (50%) of the articles, study participants were given weight scales to do self-weighing. Of these, six (55%) used technology-enhanced scales (telehealth scale, body composition monitor, digital memory scale, or cellular-connected “smart” scale), four (36%) used regular bathroom scales, and one (9%) used beam scales in different locations at a worksite to facilitate employee self-weighing.

4.3.3 Self-weighing instructions. Only seven (32%) articles reported detailed self-weighing instructions. Specific timing instructions included weighing at the same time every day (*n* = 5, 71%), weighing in the morning after waking up (*n* = 4, 57%), before breakfast (*n* = 1,

14%), after lunch and dinner or before bed time (*n* = 2, 29%), and/or after urination (*n* = 1, 14%). Specific clothing instructions included weighing without clothing [2], weighing wearing only underwear [24], or subtracting the weight of clothes after weighing [20]. Three (43%) articles described additional instructions, such as placing a weight scale on a hard surface or in the same place, or setting a scale to zero before weighing.

4.3.4 Recording and submitting weight data. Of the 20 articles that reported weight data recording and submitting information, 11 (55%) described adoption of a technology-enhanced system. Such systems (call-in, mobile phone, computer, wireless network, Internet) transmitted weight data immediately or stored the data for a period of time before transmittal. The remaining nine (45%) articles used conventional methods such as postcards, record cards, paper logs, portable booklets, or short data forms to record data, with information being submitted weekly at group meetings or via the postal mail.

4.3.5 Feedback. Only 14 (64%) articles described self-weighing-related feedback, such as how to deliver feedback to study participants and what actions to take in response to measured weight from self-weighing. Feedback could be given during face-to-face interaction by a counselor based on submitted self-weighing records or delivered via a technology-enhanced system (audio visual display on a computer or website and via email). Feedback also provided suggestions for further action to adjust eating and physical activity if measured weight from self-weighing exceeded a pre-set weight goal. One article described using a telehealth scale to prompt subjects to answer a series of questions in order to identify problems and solutions [25]. Five (36%) articles used a color zone method, similar to a three-color traffic light system, to guide participants in what action to take. For instance, when participants achieved weekly weight loss $\geq$ 1 kg (green zone), they would receive a green gift such as a green gum or green tea. A weekly

weight loss less than 1 kg was in the yellow zone and problem-solving skills would be revisited. A red zone was when a participant did not lose but gained weight. A meal replacement for one meal would take place [2,26].

4.3.6 Self-weighing prevalence and adherence. Of the 17 (77%) articles reporting self-weighing prevalence or adherence data, 11 (65%) included such data for at least two measurement points. In the intervention groups, self-weighing was reported to increase over time in five (45%) of the 11 articles [2,17,26,27,28] and decrease over time in five (45%) [19,20,27,29,30]. One (10%) did not change [31].

4.4 Intervention Efficacy and Major Findings

4.4.1 Effect of self-weighing on weight. As shown in Table 4, of the eight articles that described self-weighing as being the only self-monitoring strategy, four provided a weight outcome comparison between intervention and control groups (3 found significant weight differences). One article reported a significant weight loss difference (13.6 lbs. vs. 2.4 lbs. in 6 months) between the daily self-weighing group (n = 47) and a delayed intervention group (n = 47) [22]. A second article reported that participants (n = 3,290) who performed weekly self-weighing for three months as a weight maintenance intervention after weight loss regained back significantly less weight (.68 kg difference) at 12-month follow-up than those who (n = 478), after weight loss, did not self-weigh weekly [32]. The third article reported that participants who performed daily self-weighing were more likely to achieve a 5% weight loss goal than those who did not do self-weighing (42.6% vs. 6.8% at 3 months) [19].

Nine (64%) of the 14 articles that described combinations of self-weighing and self-monitoring of food intake and/or physical activity reported weight comparisons between intervention and control groups. Of the nine articles, six (67%) reported that intervention groups

had significantly better weight outcomes than the controls [24,26,27,30,33,34], but another three (33%) did not report any such differences by group [18,29,35]. Of the six articles that reported better weight outcomes in the intervention groups, two isolated self-weighing effect on weight outcomes. One reported that the daily self-weighing group had more weight loss than the control group that weighed themselves less than daily [27]. Another article reported that more people achieved 5% weight reduction in the group that weighed themselves twice a day than the group that weighed once a day [24].

4.4.2 Effects of self-weighing on psychological and other outcomes. Also shown in Table 4, eight (36%) of the 22 articles addressed psychological outcomes. Overall, self-weighing and self-monitoring of food intake and physical activity did not lead to negative psychological effects among study participants. Intervention and control groups did not differ in depression, disordered eating, body image, binge eating [2,22,36], mood change, or body dissatisfaction [18]. In fact, several articles reported that increased self-monitoring including self-weighing was associated with a reduction in body dissatisfaction or body shape [22,28], binge eating [36], or disordered eating [27] and with an increase in eating restraint [21,22,34,36].

4.4.3 Program satisfaction. Only three articles reported intervention acceptance and satisfaction. These study participants perceived daily self-weighing positively [19,26], and their positive ratings were stable over time [29].

4.4.4 Self-weighing frequency and weight. Nine (41%) articles reported on the relationship of self-weighing frequency to weight outcomes based on the intervention groups or across the whole sample. Eight (89%) of the nine articles reported significant relationships. Increased self-weighing frequency was associated with more weight loss [2,17,23,31,33]. Specifically, increasing one unit of self-weighing was associated with .98 kg less weight gain

[34]. Daily self-weighing was associated with weight loss [31] or weight regain of no more than 2.3 kg [30]. Daily self-weighing was related to more weight loss than weekly self-weighing (1.8 vs. 0.9 kg) [37], and weekly self-weighing was more likely to be associated with 5% weight loss than less-than-weekly weighing [23]. One article reported that both daily and weekly self-weighing promoted weight change, but obese people who performed daily self-weighing achieved the best weight loss outcome [37].

4.4.5 Self-weighing variation and weight. One article reported that not weighing for one week or more was associated with weight gain and that the days between two weight measurements were inversely related to weight loss [17]. Weight fluctuation was reported in another article on a study that asked participants to perform daily self-weighing four times a day (waking up, after lunch, after dinner, and before going to bed); the study found that increase in weight fluctuation between waking up and before going to bed predicted weight regain [20]. Whether or not self-weighing more than once a day would produce better weight outcomes was examined in a third article. Over a 12-week intervention, the proportion of those who achieved a 5% weight reduction was higher (28.6% vs. 3.6%) in those who weighed themselves twice a day compared to those who weighed once a day [24].

5. Discussion

This systematic review, including 22 articles, analyzed self-weighing in weight management research and the effects of self-weighing on weight and other outcomes. The 22 articles reported self-weighing interventions for weight loss or weight gain prevention among overweight and obese adults. Our review found that women and White populations were over-represented in the articles. According to a recent U.S. epidemiological study based on the 2011-2012 National Health and Nutrition Examination Survey, overweight and obesity in adult men 20

years of age or older are as high as those in adult women (71% vs. 66%) and Hispanic and non-Hispanic Blacks have higher rates of overweight and obesity (76%-78% vs. 67%) than non-Hispanic Whites [1]. In light of the obesity epidemic in the United States, continued development of gender or culturally relevant self-weighing interventions or weight management programs is important.

Self-weighing in our reviewed articles was used in various weight management studies. We did not find evidence that could clearly distinguish how self-weighing was implemented differently in weight loss than in weight gain prevention interventions. Our finding is in concert with a previous systematic review in which weight loss and weight maintenance (weight regain prevention after weight loss) interventions were found to be similar except that self-monitoring and cognitive strategies were emphasized more in weight maintenance interventions [14].

Only one-third of the reviewed articles adopted self-weighing as the only self-monitoring intervention; the other two-thirds combined self-weighing with other self-monitoring strategies. Self-weighing-only interventions were related to favorable weight outcomes in some of our reviewed articles [18,19,20,22]. It is, however, difficult to judge if a single self-monitoring strategy such as self-weighing is better than more complex interventions that combine self-weighing with other self-monitoring strategies. We found that self-weighing interventions in the reviewed articles involve processes (how to measure, record and report weight) and actions taken in response to weight outcomes (self- vs. researcher-initiated feedback and adjustment for food intake and physical activity). A previous systematic review suggests that behavior weight management interventions are more effective if self-weighing is included, but self-weighing without additional accountability strategies such as audit and feedback may not be effective [9]. To assess the effects of self-weighing, future studies may focus on three directions: first, using

randomized controlled trials with a no-self-weighing control group to assess the effects of self-weighing on weight and other outcomes; second, conducting randomized controlled trials to assess the efficacy of self-weighing on weight and other outcomes in self-weighing-only interventions as compared to multi-component self-monitoring interventions; third, using research design strategies such as multiphase optimization strategy [38] to tease out the effects of an individual intervention component for studies that combine self-weighing with other self-monitoring and behavioral strategies.

Self-weighing allows a researcher to measure exposure and outcome in a parallel timeframe [37]. The simultaneous behavior exposure and collection of outcomes not only benefit a researcher but also a study participant. Repeated exposure to self-weighing may improve a study participant's health outcomes, and with each self-weighing behavior weight data are collected and can be analyzed by a researcher. In this regard, a study participant performing self-weighing is also a data collector. Clear instructions and step-by-step training on when, how, and where to do self-weighing and collecting weight data would increase study fidelity. Variations in self-weighing instructions, however, were noted in the reviewed articles. Some articles provided well-specified self-weighing instructions for participants to follow when weighing themselves at home; others did not give much information. Weight may fluctuate during a day, and one study found that the fluctuation between waking up in the morning and bed time significantly predicts weight gain [20]. Instructing study participants to weigh themselves in a consistent way may be essential, especially when feedback on behavioral adjustment is dependent on the amount of weight gained or lost.

Self-weighing prevalence increased from baseline to the next data collection point in some of our reviewed articles [2,18,26,27,28]. Self-weighing adherence, however, decreased

from after treatment to a follow-up time in others [19,20,27,29,30]. Self-weighing inertia is a common problem, especially in longitudinal studies, and it even occurs when self-weighing is a must-do part of a medical treatment regimen. For instance, one study found that only 19% of heart failure patients adhered to daily weighing over a 12-month period [39]. Adhering to self-weighing requires commitment, organizational skills, and support [40]. A booster or reinforcing system may need to be incorporated in an intervention as well as after intense contacts are finished to prevent low adherence. Using an obtrusive method such as electronic beepers or other forms of communication to alert or remind a person may improve adherence to self-monitoring and recording [41]. One previous study found that 76% of overweight or obese women considered receiving up to five reminder text messages a day appropriate [42]. Sensory/information overload, however, may be an issue for some people. Future studies may explore preferred communication methods to enhance self-weighing adherence among study participants, as well as which communication methods achieve the best outcomes.

Our review found that higher self-weighing frequency is associated with better weight outcomes, including total amount of lost weight, percentage of people achieving 5% weight loss, or percentage of study participants not regaining a certain amount of weight after weight loss. Specifically, articles in our review reported that daily self-weighing was consistently related to favorable weight outcomes and that weekly self-weighing was also associated with weight loss. These findings are congruent with findings from previous systematic reviews [6,8,9].

We found no evidence that self-weighing could lead to adverse psychological effects such as depression, disordered eating, or poor body satisfaction. These negative outcomes were found in previous studies that mostly investigated adolescents and young university students [10,11]. Study populations included in our review were overweight or obese

and largely middle-aged adults. Adults, especially those who are overweight or obese, may view self-weighing as a way to control their weight in order to avoid health problems, and therefore performing self-weighing is not considered negatively. In fact, as shown in some of our reviewed articles, self-weighing is associated with less depression, disordered eating, and body dissatisfaction in overweight and obese adults [22,27,28,36].

6. Limitations

This review had some limitations. We included only published English language articles, which may have limited our ability to assess all interventions. We did not include articles that addressed self-weighing in populations with a known health problem such as diabetes, kidney disease, or heart disease. Self-weighing frequency, intervention dose, and psychological outcomes might have been different in our review had we included these populations. We did not limit our search and inclusion of literature based on the quality of each article. Efficacy outcomes related to self-weighing might be different if such an assessment criterion had been included.

7. Conclusions

In conclusion, this systematic review assessed self-weighing interventions in weight management research and the efficacy of self-weighing relative to weight and other psychological outcomes. Our findings indicate that self-weighing alone or combined with other self-monitoring strategies and at the frequency of daily or weekly is beneficial for improving not only weight outcomes but also psychological well-being in overweight or obese adults. Clear self-weighing instructions should be given to study participants to enhance accuracy of self-weighing and adherence.

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Figure 1. Summary of Evidence Search and Selection

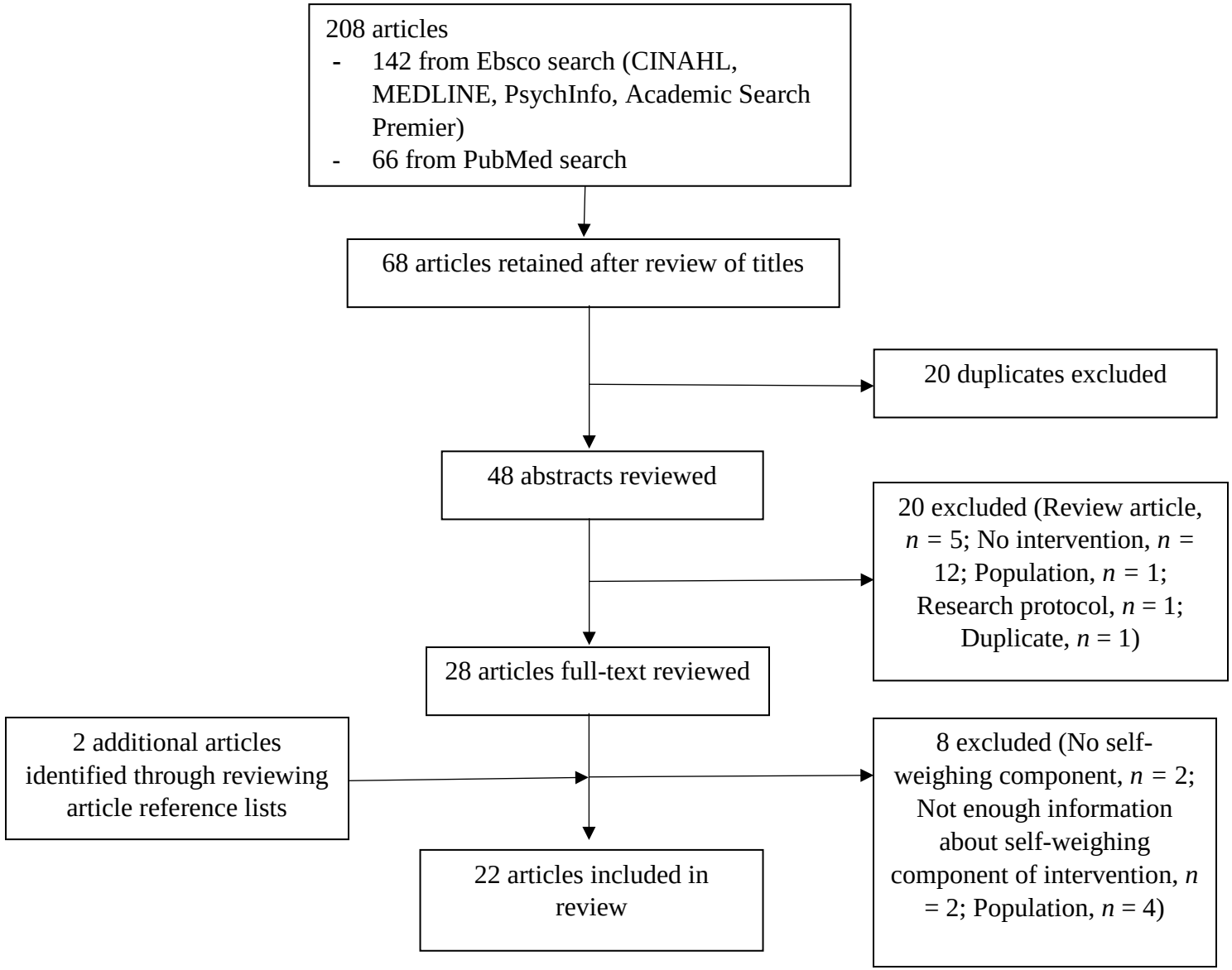

Table 1. Overview of Articles Included in the Review

Author (Year) Country	Study Target	Design	Inclusion Criteria	*N*	Sample Characteristics Age (*SD*)	Female %	White %	Theoretical Framework
Gokee-LaRose (2009) [2] USA	Weight loss	RCT pilot study (Live Well) Two arms: Daily SW (*n* = 21) Weekly at group (*n* = 19)	Age: 21-35 y.o. BMI:27–40 kg/m^2 No weight loss of ≥5% within 6 months	40	29.1 (3.9)	88	75	Self-Regulation
Gokee-LaRose (2010) [26] USA	Weight gain prevention	RCT pilot study Two arms: Small Changes (*n* = 27) Large Changes (*n* = 25)	Age: 18–35 y.o. BMI: 23–32 kg/m^2 No weight loss of ≥5% within 6 months	52	25.6 (4.7)	98	68	Self-Regulation

*Gokee-LaRose (2014) [27] USA	Weight gain prevention	Secondary analysis of a RCT Two arms: Standard lifestyle (*n* = 101) Limited food variety (*n* = 101)	Age: ≥ 21 y.o. BMI: 27– 45 kg/m^2 With complete data	178	52.0 (8.6)	53	52	NR
*Helander (2014) [17] Finland	Weight loss	Ancillary study of a workplace health promotion intervention One group (*n* = 117)	Age: NR BMI: ≥ 25 kg/m^2 ≥ 5 SW data >30 days of SW	40	45 (6.0)	67	100	NR
*Kong (2012) [35] USA	Weight loss	Ancillary study of an RCT (Nutrition and Exercise for Women) 4 arms: Diet (*n* = 118) Exercise (*n* = 117)	Age: postmenopausal BMI: overweight to obese	123	58 (NR)	100	84	NR

		Diet/exercise (*n* = 117) Control (*n* = 87)	Completed 12 months in diet or diet/exercise groups					
*#Linde (2005) [31] USA	Weight gain prevention and weight loss	Ancillary study of two RCTs (Pound of Prevention [POP]) and Weigh-To-Be [WTB]) POP: 3 arms Education (*n* = NR) Education/incentive (*n* = NR) Control (*n* = NR) WTB: 3 arms Telephone (*n* = NR) Mail (*n* = NR) Control (*n* = NR)	POP: no BMI limit WTB: BMI $\geq$ 27 kg/m2	1,226; 1,800	34.5 (6.5) 50.7 (12.4)	72-81	87-91	NR

Linde (2011) [29] USA	Weight control	RCT pilot study on employee health Two arms: Self-monitoring (*n* = 33) Control (*n* = 33)	Age: 16-85 y.o. BMI: 25-35 kg/m^2	66	44.7 (11.2)	73	82	NR
Lombard (2010) [33] Australia	Weight gain prevention	Cluster RCT (HeLP-her) Two arms: Low intensity (*n* = 127) Information (*n* = 123)	Age: women with children BMI: not underweight	250	40.39 (4.77)	100	NR	Social Cognitive Theory
Madigan (2013) [32] UK	Weigh regain prevention	Quasi-RCT (Lighten-UP Service) Two arms Intervention (*n* = 3,290) Control (*n* =478)	Age: $\geq$ 18 y.o. BMI: $\geq$ 25 kg/m^2	3,768	50.9 (14.8)	84	85	Self-Regulation

Madigan (2014) [18] UK	Weight loss	RCT Two arms: Self-weighing (*n* = 92) Control (*n* = 91)	Age: ≥ 18 y.o. BMI: ≥ 30 kg/m^2	183	I: 53.9 (14.9) C: 53.3 (14.6)	I: 63 C: 64	I:65 C:65	Self-Regulation
*#McGuire (2001) [21] USA	Weight gain prevention	Cross-sectional and prospective analysis of an RCT (POP) Three arms: Education (*n* = 25%) Education/incentive (*n* = 25%) Control (*n* = 50%)	Age: 20-45 y.o.	1,044	35.16 (6.3)	79	89	NR
Oshima (2013) [24] Japan	Weight loss	RCT Two arms: SW daily (*n* = 28) SW twice/day (*n* = 28)	Age: 40-65 y.o. BMI: > 24 kg/m^2	56	G1:48. 1 (9.2) G2:48. 4 (8.7)	NR	NR	NR

*Pronk (2011) [25] USA	Weight loss	Ancillary study of an RCT (Weight-By-Day) Two arms: Immediate SW (*n* = 45) Delayed SW (*n* = 55)	Age: ≥ 18 y.o. BMI ≥ 32 kg/m^2	100	I: 44.5 (1.4) C: 47.7 (1.1)	I: 93 C: 89	I:84 C:87	NR
Steinberg (2013) [19] USA	Weight loss	RCT (WEIGHT trial) Two arms: SW intervention (*n* = 47) Delayed SW (*n* = 44)	Age: 18-60 y.o. BMI: 25-40 kg/m^2	91	I: 43.0 (11.4) C: 44.7 (10.6)	I: 70 C: 80	I: 77 C: 71	Self-Regulation
*Steinberg (2014) [22] USA	Weight loss	Ancillary study of an RCT (WEIGHT trial) Two arms: SW intervention (*n* = 47) Delayed SW (*n* = 44)	Age: 18-60 y.o. BMI: 25-40 kg/m^2	91	I: 43.0 (11.4) C: 44.7 (10.6)	I: 70 C: 80	I: 77 C: 71	Self-Regulation

Tanaka (2004) [20] Japan	Weight regain prevention	Quasi-experimental Two arms: Weight charting (*n* = 162) No weight charting (*n* = 81)	Age: 23-66 y.o. BMI: $\geq$ 25 kg/m^2 Completed weight charting for 16 months	98	49.3 (7.8)	100	NR	NR
*VanWormer (2009) [23] USA	Weight loss	Prospective cohort study of an RCT Two arms: Immediate (*n* = NR) Delayed (*n* = NR)	Age: not reported BMI > 31 kg/m^2	100	46.5 (8.7)	91	86	NR
*VanWormer (2012) [37] USA	Weight gain prevention	Secondary analysis of an RCT (Health-Works trial) Two arms based on worksite organizations: Intervention (*n* = NR)	Working adults Complete data at 24-month follow-up	1,222	44.2 (10.3)	61	88	NR

		Control (*n* = NR)						
*Welsh (2009) [28] USA	Weight loss	Observation study of an RCT (Drop It At Last) Three arms: 10 sections (*n* = NR) 20 sections (*n* = NR) Control (*n* = NR)	Age: NR Obese adults (mean BMI = 34.2)	63	49.5 (1.4)	79	82	Self-Regulation
Wing (2006) [30] USA	Weight regain prevention	RCT (STOP Regain) Three arms: Face to face, (*n* = 105) Internet (*n* = 104) Control (*n* = 105)	At least 10% weight loss the prior 2 years	314	50.9 - 52.0 (9.3-10.8)	80-83	NR	Self-Regulation
*§Wing (2007) [36] USA	Weight regain prevention	Ancillary study of an RCT (STOP Regain) Three arms:	At least 10% weight loss the prior 2 years	314	51.3 (10.1)	81	NR	Self-Regulation

		Face to face, (*n* = 105) Internet (*n* = 104) Control (*n* = 105)						
*§Wing (2008) [34] USA	Weight regain prevention	Ancillary study of an RCT (STOP Regain) Three arms: Face to face, (*n* = 105) Internet (*n* = 104) Control (*n* = 105)	At least 10% weight loss the prior 2 years Full data at 18-month follow-up	261	51.2 (10.2)	82	98	Self-Regulation

Legend: RCT: randomized controlled trial; y.o.: years old; BMI: body mass index; kg: kilogram; m^2: meters squared; I: intervention group; C: control group; SW: self-weighing; NR: not reported
* indicates an ancillary study or a secondary study based on an original study
# indicates findings based on the Pound of Prevention trial
§ indicates findings based on the STOP Regain trial

Table 2. Details of Self-Weighing Intervention Dose and Delivery

Author (Year)	Self-Monitoring			Length	Total Number of Contacts	Frequency of Contact	Time per Contact (minutes)	Delivery Mode
	SW	Food	PA					
Gokee-LaRose (2009) [2]	X			14 wk	11	10 weekly; 1 optional booster at week 14	60	face-to-face group meetings
Gokee-LaRose (2010) [26]	X	X	X	16 wk	10	8 weekly; 2 monthly	NR	face-to-face group meetings
*Gokee-LaRose (2014) [27]	X	X	X	18 mo	48	24 weekly for 6 months; 24 biweekly for 12 months	60	face-to-face group meetings
*Helander (2014) [17]	X			8 wk	NR	NR	NR	NR

*Kong (2012) [35]	X	X	X	12 mo	30 +	24 weekly; 6 monthly; additional monthly phone/email		face-to-face group meetings and phone/email
*#Linde (2005) [31]	POP: X	POP: X	POP: X	POP: 3 yr WTB: 2 yr	POP: 4 + WTB: 10	POP: monthly WTB: NR	NR	POP: face-to-face and newsletters WTB: face-to-face meetings or written lessons
Linde (2011) [29]	X	X	X	24 wk	1	NR	90	face-to-face group meetings
Lombard (2010) [33]	X		X	12 mo	4 +	3 weekly; 4th in week 16; monthly text messages (wk 4-52)	60	face-to-face group meetings and text messages

Madigan (2013) [32]	X			3 mo	1	NR	NR	Telephone contact
Madigan (2014) [18]	X	X		3 mo	2	NR	45	face-to-face consultation
*#McGuire (2001) [21]	X			3 yr	NR	NR	NR	Mailings of monthly newsletters
Oshima (2013) [24]	X		X	12 wk	NR	NR	NR	NR
*Pronk (2011) [25]	X	X	X	6 mo	Up to 10	biweekly	NR	phone-based health coaching calls
Steinberg (2013) [19]	X			6 mo	22	weekly	NR	via e-mail
*Steinberg (2014) [22]	X			6 mo	NR	NR	NR	E-mail communication
Tanaka (2004) [20]	X			4 mo	NR	NR	NR	NR

*VanWormer (2009) [23]	X			6 mo	Up to 10	NR	NR	Counseling calls
*VanWormer (2012) [37]	X	X	X	24 mo	NR	NR	NR	Monthly newsletters
*Welsh (2009) [28]	X	X	X	6 mo	10 vs. 20	weekly	NR	telephone sessions
Wing (2006) [30]	X		X	18 mo	21	weekly for 1st month, then monthly	NR	face-to-face or Internet chat group meetings
*§Wing (2007) [36]	X		X	18 mo	22	4 weekly meetings, then monthly x 18 months	NR	face-to-face or Internet group meetings
*§Wing (2008) [34]	X		X	18 mo	22	4 weekly meetings then monthly x 18 months	NR	face-to-face or Internet group meetings

Legend: SW: Self-weighing; PA; Physical activity; wk: weeks; mo: months; yr: years; NR: not reported; POP: Pound of Prevention trial; WTB: Weight-To-Be trial

* indicates an ancillary study or a secondary study based on an original study

# indicates findings based on the Pound of Prevention trial
§ indicates findings based on the STOP Regain trial

Table 3. Details of Self-Weighing Intervention and Adherence

Author (year)	Frequency	Scale Provided & Instructions	Recording and Submitting data	Feedback	Adherence Across Time
Gokee-LaRose (2009) [2]	Daily	• Digital memory scale • Same time after waking and without clothes	• Record and submit via digital scale	Color zone system: • Green: loss ≥ 1 kg/w; received green gifts • Yellow: loss < 1 kg; problem-solving skills • Red: no loss; increased physical activity or one meal replacement	**Baseline:** 10% (daily); 25% (≥ weekly) **At 10 wks (post tx):** 95% (daily)
Gokee-LaRose (2010) [26]	Daily	NR	• Submit weight data weekly at group meetings	• Personalized charts and recommendations • Color zone system	**Baseline:** 11.5% (daily) **At 8 wks (post tx)**: 91% vs 100% daily (Large vs Small Change)

			• Automated call-in system wks 8-16.		
Gokee-LaRose (2014) [27]	Daily	NR	• Submit weight at all visits	NR	**Baseline:** 16.3% (daily) **At 6 &12 mo (during tx):** 83.7%, 72.3% (daily) **At 18 mo (post tx):** 68.2% (daily)
Helander (2014) [17]	Daily	• Weight scale • After waking up, before breakfast	• Record and submit via mobile phone	NR	**Baseline:** NR **At 12 mo (f/u):** Breaks are 2.4 (weekly), 13 (monthly), and 72 (less than monthly days
Kong (2012) [35]	Weekly	NR	NR	NR	**Baseline:** NR **At 12 mo (post tx):** 36.6% (daily or more) 63.4% (less than daily)

					88% (at least weekly)
Linde (2005) [31]	Weekly	NR	• Record on postcards • Submit postcards monthly	NR	**Baseline:** POP vs WTB: 40% vs 39% (daily/weekly) **At 12mo:** POP vs WTB: 39% vs 51% (daily/weekly) **At 24 mo:** POP vs WTB: 39% vs 49% daily/weekly)
Linde (2011) [29]	Daily	• Bathroom scale	• Record on postcards • Submit postcards weekly	• At group meetings	**Baseline:** NR **After wk 1 and 6**: 90% (wk1) and 58% (wk6) of postcards received **Baseline to 3mo**:

					7.6 days to 25.5 days **Baseline to 6 mo (post tx):** 7.6 to 19.3
Lombard (2010) [33]	NR	NR	NR	NR	NR
Madigan (2013) [32]	Weekly	• Voucher to buy scale if none at home	• Record on weight cards	NR	NR
Madigan (2014) [18]	Daily	• Same time daily • Put the scale in a same place	• Record weight on card • Weekly text message to prompt self-weighing	• Self-calculate average weight for the week and compare weight to weight loss goal of 0.5 kg/w	**Baseline:** 0% **At 3 mo (post tx):** 60% (daily) 73.1% (weekly)
McGuire (2001) [21]	NR	NR	• Record on postcards • Return by m ail	NR	**At baseline:** 4.79 days/month **At 3 years (f/u):**

					Reduced by 0.33 days/month
Oshima (2013) [24]	Daily	• Body composition monitor • Same time daily • Underwear only and after urination. • After waking & before going to bed	• Record and submit via a connected computer.	• Measured weight, and the weight difference between these two measures were displayed on an LCD.	**Baseline**: NR **At 12 weeks (post tx)**: 92.7% and 92.5% (once a day vs twice a day)
Pronk (2011) [25]	Daily	• Home telehealth scale	• Record and submit via telehealth scale	• The telehealth scale provided visual and audio feedback • Weekly tailored feedback via email	NR

				• An alert to the health coach if no weight-in data or gain ≥ 4 lbs in 3 days	
Steinberg (2013) [19]	Daily	• Cellular-connected "smart" scale • Same time daily	• Record and submit via a wireless cellular network embedded in the scale	• Web-based graph of weight trends over time, • Weekly tailored feedback via e-mail on weighing frequency and weight loss progress	**Baseline:** NR **Between 6 (post tx) to 9 mo (f/u):** 6.1±1.1 to 4.0±2.3 days/week 57% weighed ≥ 5 days/week
Steinberg (2014) [22]	Daily	• Cellular-connected "smart" scale • Same time daily	• Record and submit via a wireless cellular network embedded in the scale	• Tailored feedback to each participant with the expected rate of weight loss at 0.5 lbs per week	**Baseline:** NR **At 6 mo (post tx):** 51% (daily) 94% ≥ 5 days/week

Tanaka (2004) [20]	4 times per day	• Subtract weight of clothing • After waking up/lunch/ dinner, and before going to bed • Scale on a hard, flat floor, set to zero before use	• Record weight and main cause of daily weight fluctuation on paper log (charting)	NR	**Baseline**: NR **At 4 (post tx), 8, 12, and 16 mo (f/u)**: Attrition: charting vs non charting 2.5% vs 28.4%% (4 mo); 18.5% vs 64.2% (8 mo) 14.8% vs 39.5% (12 mo) 46.9% vs 79.9% (16 mo)
VanWormer (2009) [23]	Daily	• Home telemonitoring scale provided	• Record and submit via a phone line connected to the scale.	• Counselors provided customized feedback.	**Baseline:** NR **During tx:** 50% (at least weekly) 55.4 days of self-monitoring (175 days as total treatment)

VanWormer (2012) [37]	Variable	• Beam scales are located in worksite buildings	• Record weight on a short form in a station • Submit weight form in a locked box	• Aggregate feedbacks in newsletters	**Baseline:** NR **At 24-mo (f/u)**: 17% (daily or more), 28% (weekly), 55% (monthly or less)
Welsh (2009) [28]	Daily	NR	• Record weight in a portable booklet • Mail booklet weekly	• Feedback given by counselor at weekly sessions	**At baseline**: 16% (daily) 38% (weekly) 46% (≤ once a month). **At 6 mo (post tx):** 38% (daily), 44% (weekly), 18% (≤ once a month)
Wing (2006) [30]	Daily	• Scale	• Record and submit weekly via an	• Feedback given based on color zones.	**From baseline to 18 mo:** Face-to-face (weekly): 84.0% (baseline to 6 mo),

			automated telephone system or a website	➢ Green: < 1.4kg regain over the starting weight-reinforcement ➢ Yellow: 1.4-2.2 kg gain—problem-solving skills ➢ Red: ≥ 2.3 kg gain -- weight loss approach and counseling	68.6% (7 to 12 mo), 56.1% (13 to 18 mo) Internet (weekly): 82.0% (baseline to 6 mo), 69.1% (7 to 12 mo), 55.3% (13 to 18 mo).
Wing (2007) [36]	Daily	NR	• Record and submit weekly via Internet diary or automated phone system.	• ≤ 2 lbs weight gain of starting weight - monthly gifts given • 2.1-4.9 lbs gain - problem solving • ≥ 5 lbs gain - restart weight loss efforts	NR

Wing (2008) [34]	Daily	NR	• Record and submit weekly via phone or web-based form	Color zones • Green: < 1.4kg regain over the starting weight-reinforcement • Yellow: 1.4-2.2 kg gain—problem solving skills • Red: ≥ 2.3 kg gain -- weight loss approach and counseling	NR

Legend: wks: weeks; mo: months; tx: treatment; f/u: follow-up; NR: not reported

Table 4. Self-Weighing Intervention Efficacy and Major Findings

First Author (Year)	Outcome Variables	Measures	Major Findings
*Gokee-LaRose (2009) [2]	1. Weight 2. Frequency of weighing 3. Disordered eating 4. Body image 5. Depression	1. Objective measures 2. Self-report & digital memory scale 3. Eating Disorder Examination-Self-Report Questionnaire 4. Body Shape Questionnaire 5. Beck Depression Inventory	1. NS group x time interaction 2. Intervention > control (70.6% vs. 0% SW daily at 20 weeks, $p < .001$) • Higher SW frequency, more weight loss ($p = .01$) 3. NS group x time interaction 4. NS group x time interaction 5. NS group x time interaction
Gokee-LaRose (2010) [26]	1. Weight 2. Frequency of weighing 3. Eating and physical activity manipulation	1. Method NR 2. Self-report at each time point 3. Likert-type questions (differences and difficulty	1. Large change > small change (3.2 vs. .68 kg weight loss at 8 weeks, $p < .001$; and 3.5 vs. 1.5 kg at 16 weeks, $p = .006$) 2. Large change > small change (61% vs. 90% SW daily at 16 weeks, $p < .05$)

	4. Acceptability/ satisfaction	in eating and activity 4. Likert-type questions	3. Eating favors large change group and physical activity favors small change group ($p < .01$) 4. NS group x time interaction
Gokee-LaRose (2014) [27]	1. Anthropometrics 2. Frequency of weighing 3. Disordered eating (DE)	1. Objective measures 2. Multiple-choice question (*Frequency in past month)* 3. Eating Disorder Diagnostic Screening	1. Daily SW > less-than-daily SW (13.8 vs. 9.4 kg weight loss at 12 months, $p = .008$; and 13.4 vs. 7.4 kg at 18 months, $p = .043$) 2. NR 3. Daily SW < less-than-daily SW ($p = .03$)
*Helander (2014) [17]	1. Weight 2. Weight change 3. Self-weighing Frequency (break between two measures)	1. Extracted from mobile phone 2. Percent of change between 2 consecutive measurements 3. Categorized as daily, at least weekly, at least	1. NR 2. NR, higher SW frequency, more weight loss ($p < .001$) 3. NR, weight gain associated with breaks longer than a week ($p = .042$); longer days of break, lower weight loss ($p < .001$)

		monthly, or less than monthly	
Kong (2012) [35]	1. Anthropometric 2. Eating-related weight control strategies 3. Self-monitoring behaviors 4. Meal frequency	1. Balance beam scale 2. Questionnaires about strategies and dietary change 3. Self-report questions: food journals and calorie counting 4. 3-item questions	1. NS group x time interaction 2. NR 3. NR; completing more food journals, greater weight loss ($p < .0001$) 4. NR; skipping meals ($p < .05$) and eating out for lunch $\geq$ once weekly ($p < .01$) associated with less weight loss.
Linde (2005) [31]	1. BMI 2. Frequency of weighing 3. Fat intake 4. Exercise	1. Weight by staff & self-report 2. Never, every other month, monthly, weekly, and daily 3. Block food Frequency	1. NR 2. Intervention > control (Intervention increased, control decreased, $p = .001$); daily weighing associated with weight loss 3. NR 4. NR

		4. Self-report and Paffenbarger Activity Questionnaire	
Linde (2011) [29]	1. Weight/weight change 2. Frequency of weighing 3. Intervention behavior tracking 4. Intervention salience & reinforcement properties	1. Seca 882 digital scale 2. One single question 3. Weekly SW record 4. Questionnaire (enjoyable, easy, satisfying, etc.)	1. NS group x time interaction 2. Intervention > control (7.6 to 25.5 days vs. 5.5 to 7.3 days from baseline to 3 months, $p < .001$) 3. NR; adherence rate was 52% 4. NS group x time interaction
Lombard (2010) [33]	1. Weight change 2. Metabolic variables 3. Dietary energy and fat 4. Physical activity	1. Over 12 months (mean kg) 2. Blood sample 3. Cancer Council Victoria food questionnaire	1. Intervention < control (-.20 vs. .83 kg change, $p <$ .05) • Self-weighing associated with weight loss ($p =$ .03).

	5. Eating and exercise confidence 6. Self-management strategy	4. International Physical Activity Questionnaire 5. Eating and Exercise Confidence Scale 6. Strategies for physical activity (12 items) and diet (16 items)	2. Intervention < control for cholesterol ($p < .05$) 3. NS group x time interaction 4. Intervention > control ($p < .05$) 5. Intervention > control ($p = .01$) 6. Intervention > control ($p < .001$)
*Madigan (2013) [32]	1. Weight	1. Weight change (kg)	1. Intervention < control (1.23 vs. 1.83 kg regained weight, $p < .001$)
Madigan (2014) [18]	1. Weight 2. Weighing frequency 3. Weight management strategies 4. Physical activity	1. Weight on validated scale 2. Self-report and weight scale 3. Self-report (mood and perception of body) 4. International Physical Activity Questionnaire	1. NS group x time interaction 2. NS group x time interaction • Frequency not associated with weight loss 3. NS group x time interaction 4. NS group x time interaction

*McGuire (2001) [21]	1. Weight 2. Weighing frequency 3. Eating restraint 4. Weight controlling behavior 5. Dietary intake 6. Physical Activity	1. Objective weight measure 2. frequency per month 3. Cognitive Restraint Scale of Eating Inventory 4. One question (dieting) 5. Block Food Frequency & Food Habits Questionnaires 6. Physical Activity History and one single item assessing sedentary behavior	1. NR 2. NR 3. NR but higher baseline restraint, higher weighing frequency over 3 years 4. NR but increased restraint, lower weight (p = .001) 5. NR but increased restraint, lower caloric intake, fat, and sweet intakes (p = .001) 6. NR but increased restraint, more physical activity (p = .001)
Oshima (2013) [24]	1. Body weight 2. Adherence to weight measurement 3. Daily physical	1. HBF-201 Body Composition Monitor 2. Execution rate: number of weight measurement days	1. SW twice a day > once a day (1.0 vs. 2.7 kg weight reduction and 28.6% vs. 3.6% lost 5% weight p < .05) 2. NS group x time interaction

	activity	divided by intervention period 3. Accelerometer (steps/day); total energy expenditure (TEE)	3. NR
Pronk (2011) [25]	1. Weight 2. Absolute weight discrepancy 3. Relative weight discrepancy	1. Calibrated Thin-Link scales and self-report 2. Difference between self-reported and measured weight 3. Subtracted self-reported body weight from measured weight	1. NR 2. NS group x time interaction 3. NS group x time interaction
*Steinberg (2013) [19]	1. Weight/weight change 2. Frequency of	1. Weight using a digital scale 2. Objectively, via smart	1. Intervention > control (−6.55% vs. −0.35% weight loss; 42.6% vs. 6.8% achieved 5% weight loss;

weighing 3. Diet 4. Physical activity 5. Daily self-weighing perceptions 6. Self-monitoring of diet and physical activity behaviors	scales 3. Automated Self-Administered 24-Hour Dietary Recall 4. Paffenbarger Exercise Habits Questionnaire 5. 8-point scale (easy to do, to remember, helpful, positive, continue to monitor after the study) 6. Two self-report measures with 5 response options	27.7% vs. 0% achieved 10% weight loss at 6 months, $p < .001$) 2. Intervention > control (6.1 vs. 1.1 days/week, $p < .0001$) 3. Intervention < control (1,509 vs. 1,856 calories consumed/day, $p = .006$) 4. NS group x time interaction 5. NS group x time interaction 6. NS group x time interaction

*Steinberg (2014) [22]	1. Weight/height 2. Body satisfaction 3. Depressive symptoms 4. Disordered eating cognitions and behaviors 5. Binge eating 6. Restraint/disinhibition /hunger	1. Digital scale and stadiometer 2. Body Shape Questionnaire 3. Center for Epidemiologic Studies Depression Scale 4. Mizes Anorectic Cognitions Questionnaire 5. The Questionnaire for Eating and Weight Patterns revised 6. Three-Factor Eating Q	1. Intervention > control (-13.6 vs. -0.68 lbs. weight loss at 6 months, $p < .001$) 2. Intervention < control in body dissatisfaction ($p = 0.007$) 3. NS group x time interaction 4. NS group x time interaction 5. NS group x time interaction 6. Intervention > control group in dietary restraint ($p < .001$)

*Tanaka (2004) [20]	1. Body weight 2. Body weight fluctuations 3. Biological parameters (blood glucose, insulin, HOMA-R, lipids) 4. Visceral and subcutaneous fats 5. Rate of attrition	1. Self-weighing chart record 2. Measured with standard deviations 3 Fasting blood sample 4. MRI to measure visceral and subcutaneous adipose tissue accumulation at the umbilical level 5. Percent dropped out of study	1. NR but significant weight reduction over time ($p <$ .001) 2. NR but increase in weight difference between waking up and bed time, more weight regain ($p =$ .001) 3. Significant improvement over time for all biological parameters ($p <$ .001) 4. Significant change over time in visceral fat between large and small weight fluctuation groups ($p = .48$) 5. Charting group demonstrated less attrition than non-charting group ($p < .0001$).
*VanWormer (2009) [23]	1. Body weight 2. Weighing frequency	1. NR; weight loss was $\geq$ 5% of pretreatment weight 2. % of SW days	1. NR 2. NR but more frequent SW, greater weight loss. • 46% vs. 8% achieved $\geq$ 5% weight loss (weekly vs. less than weekly)

VanWormer (2012) [37]	1. Body weight change 2. Weighing frequency	1. Calculated by the difference in body weight between both measured time points. 2. Single-item self-reported measure with 7 total response options	1. NR but both daily ($p < 0.001$) and weekly ($p = 0.022$) SW at 24-month associated with weight change. • 1.8 kg vs. .9 kg weight loss (daily vs. weekly SW) • The greatest weight loss was observed in obese participants at baseline and reported SW daily at the 24-month follow-up (mean ± SE −4.4±0.8 kg). 2. NR
Welsh (2009) [28]	1. Weight change 2. Weighing frequency 3. Body satisfaction	1. Weight using calibrated scale 2. Self-report with 7 response options 3. Body Shape Questionnaire (BSQ) and body dissatisfaction subscale of Eating Disorder Inventory	1. NR but increased SW frequency, more weight loss ($p = .006$) over 6 months • -6.8 kg vs. -3.1 kg weight loss (SW daily vs. weekly) 2. NR 3. NR, but NS change in BSQ and EDI scores over time ($p = .90$. and .62) and increased frequency was

		(EDI)	associated with reduction in BSQ score at over 6 months (p = .02)
Wing (2006) [30]	1. Weight/weight gain 2. Weighing frequency 3. Diet 4. Physical activity	1.Calibrated weight scale and % of gaining 2.3Kg at 18 mo 2. Self-report frequency 3. Block Food Frequency Q 4. Paffenbarger Physical Activity Q	1. Face-to-face < Internet and control (2.5 vs. 4.7, and 4.9 kg weight gain, p = 0.05; 45.7% vs. 54.8%, and 72.4% weight regain $\geq$ 2.3.kg) 2. NR but daily self-weighing associated with a decreased risk of regaining 2.3 kg or more ($p < 0.001$). 3. NS group x time interaction 4. NS group x time interaction
Wing (2007) [36]	1. Depression 2. Binge-eating behavior 3. Restraint/disinhibition 4. Frequency of weighing	1. Beck Depression Inventory (BDI) 2. Eating Disorder Examination Questionnaire 3. Eating Inventory	1. NS group x time interaction 2. NS group x time interaction but daily SW associated with lower risk for > 4 binge episodes per month (p = .03). 3. Face-to-face > control in restraint (p = .02) but NS in disinhibition

		4. 7-point scale assessing how frequently self-weighing occurred in the past several months	4. NR but higher SW frequency, less depression ($p <$ .002), less disinhibition ($p <$ .003), and higher dietary restraint ($p <$ .001)
Wing (2008) [34]	1. Weight/height 2. Frequency of weighing 3. Physical activity 4. Portion size/frequency of consumption 5. Restraint/disinhibition /hunger 6. Depression	1. Calibrated scale and stadiometer 2. 7-point scale assessing how frequently self-weighing in the past several months 3. Paffenbarger Questionnaire 4. Block Food Frequency Questionnaire 5. Eating Inventory 6. Beck Depression	1. Intervention < newsletter (weight regain rate accelerated more in the newsletter group than the intervention groups, 6 to 18 months, $p = .0348$) 2. NR but a one-unit increase in SW was associated with .98 kg less weight gain in intervention groups ($p = .0005$) 3. Internet and newsletter groups decreased but face-to-face groups unchanged ($p = .0005$) 4. NR 5. Face-to-face > Internet and newsletter in restraint ($p = .0002$).

	Inventory (BDI)	6. NR but increased depressive symptoms, more weight gain ($p < .0001$).

Legend: Kg: kilogram; NR: group x time interaction not reported; CI: confidence interval; lbs: pounds; NS: non-significant; SW: self-weighing

*indicates self-weighing as the only self-monitoring strategy

Numbers for each outcome variable in the first column correspond with measures and findings for the variable in the other columns